Amendments to the Claims

Please amend the claims as follows:

Claims 1-82 (Cancelled).

83. (Currently Amended) Method for the contactless detection of flat objects, such as papers in sheet form with respect to a single sheet, a missing sheet and multiple sheets of said flat objects,

said flat objects being placed in a beam path of at least one transmitter (T) and an associated receiver (R) of a sensor device,

wherein a radiation transmitted between said at least one transmitter (T) and said receiver (R) is received by said receiver (R) in the form of a measuring signal (U_M),

said measuring signal (U_M) is supplied to a following evaluation for generating a corresponding detection signal,

wherein a characteristic of an input voltage (U_E, U_M) of said measuring signal (U_M) is formed, and

wherein at least one correction characteristic (KK) is provided for evaluation,

said correction characteristic (KK) transforms said characteristic of the input voltage (U_E, U_M) of said measuring signal (U_M) from said receiver (R) as a function of a weight per unit area of said flat objects [[(2)]] to a target characteristic (ZK),

~~that for~~ wherein said papers in sheet form an approximately linear characteristic approaching an ideal single sheet characteristic with a gradient of approximately "0" is obtained as said target characteristic between an output voltage (U_A, U_Z) at an output of the evaluation and said weight per unit area, in order to generate said corresponding detection signal, and

wherein the evaluation of the measuring signal takes place by means of a correction characteristic in amplitude evaluation form, and wherein a measuring signal phase undergoes a phase evaluation and that by linking both evaluations the detection signal is generated for single, missing and multiple sheets of said flat objects such as papers.

84. (Currently Amended) Method according to claim 83, wherein said correction characteristic (KK) for papers and similar materials is derived from a characteristic of said input voltage ~~(UE, UM)~~ (U_E, U_M) of said measuring signal mirrored on an ideal or approximated target characteristic (ZK) for single sheet detection.

85. (Currently Amended) Method according to claim 83, wherein the correction characteristics for papers is derived from a target characteristic approximated to the ideal target characteristic of the single sheet detection following Cartesian coordinate transformation with respect to a line linking two end points of the characteristic of said measuring signal for a material spectrum of said weight per unit area to be detected mirroring the characteristic of the input voltage ~~(UE, UM)~~ (U_E, U_M) of the measuring signal.

86. (Currently Amended) Method according to claim 83, wherein ~~by means of said correction characteristic~~ said characteristic of the input voltage ~~(UE, UM)~~ (U_E, U_M) of the measuring signal is transformed using said correction characteristic into said target characteristic over a wide weight per unit area range between about 8 and 4000 g/m^2.

87. (Currently Amended) Method for the contactless detection of flat objects, such as multilaminated materials like labels adhesively applied to support material,
with respect to [[the]] a presence or absence of said flat objects, said flat objects being placed in a beam path between a transmitter (T) and an associated receiver (R) of a sensor device,
wherein a radiation transmitted through the flat objects or the radiation received in the case of an absence of said flat objects by said receiver (R), is received as measuring signal (U_M) said measuring signal (U_M) is supplied to a following evaluation for generating a corresponding detection signal,
wherein a characteristic of an input voltage (U_E, U_M) of said measuring signal (U_M) is formed, [[and]]
wherein at least one correction characteristic (KK) is supplied to said evaluation,

said correction characteristic (KK) transforms the characteristic of the input voltage (U_E, U_M) of said measuring signal (U_M) from said receiver (R) as a function of a weight per unit area of said flat objects [[(2)]] to a target characteristic (ZK),
~~that for~~ wherein for said multilaminated materials an almost linear characteristic with a maximum finite gradient in said weight per unit area range to be detected is obtained as said target characteristic approximated to [[said]] an ideal target characteristic between an output voltage (U_A, U_Z) at the output of the evaluation and said weight per unit area, for generating said corresponding detection signal, and
wherein the evaluation of the measuring signal takes place by means of a correction characteristic in amplitude evaluation form, and wherein a measuring signal phase undergoes a phase evaluation and that by linking both evaluations the detection signal is generated for said flat objects such as multilaminated materials like labels.

88. (Currently Amended) Method according to claim 87, wherein said correction characteristic (KK) for multilaminated materials like labels is derived from the characteristic of said input voltage ~~(UE, UM)~~ (U_E, U_M) of said measuring signal, which is mirrored on an ideal detection characteristic (ZK) for multilaminated materials in the weight per unit area range to be detected.

89. (Currently Amended) Method according to claim 87, wherein said correction characteristic (KK) for multilaminated materials like labels is derived from the characteristic of said input voltage ~~(UE, UM)~~ (U_E, U_M) of said measuring signal, which is mirrored on an ideal detection characteristic (ZK) for multilaminated materials in weight per unit area range to be detected following Cartesian coordinate transformation relative to a connecting line of two end points of the measuring signal characteristic for a material spectrum of said weight per unit area range to be detected.

90. (Currently Amended) Method according to claim 87, wherein in the case of multilaminated materials like labels, ~~by means of said correction characteristic (KK)~~ the characteristic of said input voltage ~~(UE, UM)~~ (U_E, U_M) of said measuring signal is transformed using said correction characteristic (KK) to said target characteristic (ZK)

over the weight per unit area range to be detected, between approximately 40 to 300 g/m^2.

91. (Previously Presented) Method according to claim 87, wherein said correction characteristic (KK) is chosen in such a way that said target characteristic (ZK) is obtained with a maximum finite, constant negative gradient and maximum voltage difference over the weight per unit area range to be detected, between approximately 40 to 300 g/m^2.

92. (Currently Amended) Method according to claim 87, wherein an amplitude of the measuring signal is evaluated, wherein the evaluation~~, particularly~~ of the measuring signal amplitude[[,]] is performed at least over one signal amplification, [[that]] and wherein said signal amplification is supplied with at least one correction characteristic in such a way that at the signal amplification output said target characteristic for generating the detection signal is obtained.

93. (Currently Amended) Method according to claim 83, wherein an amplitude of the measuring signal is evaluated, wherein the evaluation~~, particularly~~ of the measuring signal amplitude is performed at least over one signal amplification, [[that]] and wherein said signal amplification is supplied with at least one correction characteristic in such a way that at the signal amplification output said target characteristic for generating the detection signal is obtained.

94. (Currently Amended) Method according to claim 93, wherein analog signals of an analog-digital conversion received in the receiver (R) with subsequent or direct digital rating are subject to at least one correction characteristic for generating said corresponding detection signal.

95. (Currently Amended) Method according to claim 83, wherein as flat objects also cardboard in sheet form, corrugated board or stackable packages are placed in the beam path between transmitter (T) and receiver (R).

96. (Cancelled).

97. (Cancelled).

98. (Currently Amended) Method according to claim [[96]] 83, wherein for phase evaluation [[the]] a phase difference between [[the]] a phase of the transmitter (T) signal [[phase]] and [[the]] a phase of the receiver (R) signal [[phase]] is formed.

99. (Currently Amended) Method according to claim [[97]] 87, wherein for phase evaluation [[the]] a phase difference between [[the]] a phase of the transmitter (T) signal [[phase]] and [[the]] a phase of the receiver (R) signal [[phase]] is formed.

100. (Previously Presented) Method according to claim 98, wherein the phase difference is determined as an analog output signal.

101. (Previously Presented) Method according to claim 99, wherein the phase difference is determined as an analog output signal.

102. (Previously Presented) Method according to claim 98, wherein the phase difference is determined as a digital output signal.

103. (Previously Presented) Method according to claim 99, wherein the phase difference is determined as a digital output signal.

104. (Previously Presented) Method according to claim 98, wherein the phase difference is determined by synchronous rectification.

105. (Currently Amended) Method according to claim [[96]] 83, wherein a logical interconnection is performed between said output signals of the amplitude evaluation and said phase evaluation for generating a detection signal.

106. (Currently Amended) Method according to claim [[97]] 87, wherein a logical interconnection is performed between said output signals of the amplitude evaluation and said phase evaluation for generating a detection signal.

107. (Currently Amended) Method according to claim [[96]] 83, wherein a weighted comparison takes place between the output signals of the amplitude evaluation and the phase evaluation for generating the detection signal.

108. (Currently Amended) Method according to claim [[97]] 87, wherein a weighted comparison takes place between the output signals of the amplitude evaluation and the phase evaluation for generating the detection signal.

109. (Previously Presented) Method according to claim 83, wherein said correction characteristic is impressed as a single characteristic over the entire weight per unit area range.

110. (Previously Presented) Method according to claim 87, wherein said correction characteristic is impressed as a single characteristic over the entire weight per unit area range.

111. (Previously Presented) Method according to claim 83, wherein said correction characteristic is impressed as a zonal combination of several different correction characteristics.

112. (Previously Presented) Method according to claim 83, wherein said correction characteristic is impressed as a continuous correction characteristic over portions of the entire weight per unit area range.

113. (Currently Amended) Method according to claim 83, wherein said correction characteristic is fixed, and wherein said fixed correction characteristic is impressed.

114. (Previously Presented) Method according to claim 83, wherein said correction characteristic is actively controlled.

115. (Currently Amended) Method according to claim 87, wherein said correction characteristic is fixed, and wherein said fixed correction characteristic is impressed.

116. (Previously Presented) Method according to claim 87, wherein said correction characteristic is actively controlled.

117. (Currently Amended) Method according to claim 83, wherein with respect to the single, missing and multiple sheet, at least two thresholds are given as [[the]] an upper and lower threshold and in the case of the incoming measuring signal being larger than the upper threshold, it is evaluated as a "missing sheet", when the incoming measuring signal is between the thresholds this is evaluated as a "single sheet" and when the incoming measuring signal is smaller than the lower threshold, this is evaluated as a "multiple sheet".

118. (Previously Presented) Method according to claim 87, wherein relative to flat objects like labels, splices and break points and tear-off threads there is at least one detection threshold, on passing below said detection threshold this is evaluated as a "multiple layer" and on exceeding the detection threshold it is evaluated as a "support material or a multiple layer reduced by at least one layer".

119. (Currently Amended) Method according to claim 117, wherein the thresholds are ~~designed so as to be~~ dynamically carried along.

120. (Currently Amended) Method according to claim 118, wherein said at least one detection threshold is ~~designed so as to be~~ dynamically carried along.

121. (Previously Presented) Method according to claim 83, wherein said correction characteristic is determined as a function of the object and material-specific

transmission attenuation and the resulting measuring signal voltage depending on the weight per unit area, and wherein from this determination takes place of the optimum correction characteristic.

122. (Previously Presented) Method according to claim 83, wherein said correction characteristic for several areas of material spectra is subdivided into several sections.

123. (Previously Presented) Method according to claim 122, wherein at least three sections are provided and associated with different weight per unit area ranges.

124. (Currently Amended) Method according to claim 83, wherein at least one sensor, selected from the group consisting of an ~~out of a group of~~ ultrasonic sensor, an optical sensor, a capacitive sensor, and an inductive sensor[[s]], is used as said sensor device.

125. (Currently Amended) Method according to claim 87, wherein at least one sensor, selected from the group consisting of an ~~out of a group of~~ ultrasonic sensor, an optical sensor, a capacitive sensor, and an inductive sensor, is used as said sensor device.

126. (Currently Amended) Method according to claim 83, wherein said transmitter (T) and receiver (R) of said sensor device [[(10)]] are oriented with respect to one another in a main beam axis of the radiation used and wherein the main beam axis is oriented substantially perpendicular to [[the]] a plane of said flat objects moved at least relative between the transmitter (T) and the receiver (R).

127. (Currently Amended) Method according to claim 83, wherein said sensor device [[(10)]] can be operated in switchable manner from pulsed operation to continuous operation and vice versa.

128. (Currently Amended) Method according to claim 87, wherein said sensor device [[(10)]] can be operated in switchable manner from pulsed operation to continuous operation and vice versa.

129. (Currently Amended) Method according to claim 127, wherein in continuous operation of said sensor device [[(10)]] short interruptions of the transmitting signal are provided to prevent standing waves and interference.

130. (Previously Presented) Method according to claim 83, wherein the transmitting signal of transmitter (T) is frequency-modulated.

131. (Currently Amended) Method according to claim 83, wherein for ultrasonics, transmitter (T) and receiver (R) are standardized pairwise to an optimum assembly spacing and wherein tolerances of the transmitter (T) and receiver (R) are automatically corrected at the start and during continuous operation.

132. (Currently Amended) Method according to claim 83, wherein the spacing between the transmitter (T) and receiver (R) is determined by reflection of the radiation used between transmitter (T) and receiver (R) when attenuating sheet material is positioned between [[them]] the transmitter (T) and receiver (R), and that on rising above or dropping below [[the]] a permitted spacing[[s]] a fault announcement is provided.

133. (Currently Amended) Method according to claim 83, wherein for the detection of single-corrugation and multiple-corrugation corrugated board and the conveying direction thereof, [[the]] a sensor axis between the transmitter (T) and receiver (R) of at least one sensor is placed so as to be inclined to [[the]] a perpendicular of the corrugated board sheet and ~~in particular~~ orthogonally to [[the]] a widest surface of the corrugated board corrugation.

134. (Currently Amended) Method according to claim 83, wherein a feedback for maximizing the amplitude of said measuring signal received is performed between a device for performing said evaluating ~~device~~ and said transmitter (T).

135. (Previously Presented) Method according to claim 94, wherein for digitizing the analog measuring signal use is made of at least one A/D converter and for selecting the different signals of the signal amplifying devices use is made of a multiplex method.

136. (Currently Amended) Device for the contactless detection of flat objects,
with first flat objects such as papers in sheet form, with respect to a single sheet, a missing sheet and multiple sheets of said first flat objects, and
second flat objects such as multilaminated materials like labels adhesively applied to support materials, with respect to [[the]] <u>a</u> presence or absence of said second flat objects,
said device having at least one sensor device [[(10)]] with at least one transmitter (T) and an associated receiver (R),
said first and second flat objects being placed in a beam path between said transmitter (T) and said receiver (R) for detection,
said receiver (R) receiving a measuring signal by a radiation transmitted between said at least one transmitter (T) and said associated receiver (R),
with means for forming a characteristic of an input voltage (U_E, U_M) of said measuring signal (U_M), and with a downstream evaluating device [[(4)]] to which said measuring signal (U_M, U_E) is supplied for generating a corresponding detection signal, wherein

said evaluating device (4) has several specific channels for the detection of said first flat objects such as papers and said second flat objects such as multilaminated materials,

said specific channels having impressed different correction characteristics for the characteristic of the input voltage (U_E, U_M) of said measuring signal (U_M) for papers and for multilaminated materials,

said correction characteristics (KK) transform said characteristics of the input voltage (U_E, U_M) of said measuring signal from said receiver (R) as a function of the weight per unit area of the flat objects so as to give a corresponding target characteristic (ZK),

<u>wherein</u> ~~that it is possible for~~ the first flat objects such as papers [[to]] produce an approximately linear characteristic approaching an ideal single sheet characteristic with

a gradient of approximately “0” in the form of said corresponding target characteristic (ZK) between an output voltage (U_A, U_Z) at an output of said evaluating device and the weight per unit area, in order to generate said corresponding detection signal, for said first flat objects,

~~and~~

wherein ~~that it is possible for~~ the second flat objects such as multilaminated materials [[to]] produce an almost linear characteristic having a maximum finite gradient in said weight per unit area range to be detected, as a target characteristic approximating said ideal target characteristic between an output voltage (U_A, Z_U) at the output of said evaluation device and said weight per unit area, in order to generate said corresponding detection signal for said second flat objects, and

wherein the evaluating device for the measuring signal amplitude is associated with an evaluating device for the measuring signal phase and wherein the signals of both evaluating devices are supplied to a device for generating a combined output signal as the detection signal.

137. (Currently Amended) Device according to claim 136, wherein the evaluating device [[(4)]] has a correction characteristic (KK) for said first flat objects with a characteristic of said input voltage ~~(UE, UM)~~ (U_E, U_M) of the measuring signal mirroring the ideal or thereto approximated target characteristic (ZK) for the purpose of single sheet detection.

138. (Currently Amended) Device according to claim 136, wherein said correction characteristic for first flat objects is chosen in such a way that the characteristic of said input voltage ~~(UE, UM)~~ (U_E, U_M) of the measuring signal is transformable into the target characteristic over a weight per unit area range particularly between about 8 and 4000 g/m^2.

139. (Currently Amended) Device according to claim 136, wherein said correction characteristic (KK) for the second flat objects can be produced by mirroring the characteristic of said input voltage ~~(UE, UM)~~ (U_E, U_M) of the measuring signal on the

ideal detection target characteristic (ZK) for the second flat objects in the weight per unit area range to be detected.

140. (Currently Amended) Device according to claims 136, wherein said correction characteristic for the second flat objects is chosen in such a way that the characteristic of the measuring signal input voltage ~~(UE, UM)~~ (U_E, U_M) is transformable to the target characteristic over a gram weight or weight per unit area range of approximately 40 to 300 g/m^2.

141. (Previously Presented) Device according to claim 136, wherein said target characteristic (ZK) for the second flat objects has a maximum finite, constant negative gradient and a maximum voltage difference relative to changes in the weight per unit area range between about 40 to 300 g/m^2.

142. (Currently Amended) Device according to claim 136, wherein said evaluating device [[(4)]] has at least one amplifying device [[(5)]] and wherein the amplifying device (5) is supplied with at least one correction characteristic (KK) for producing said target characteristic (ZK) at the output of said amplifying device.

143. (Currently Amended) Device according to claim 136, wherein said evaluating device (4) has an analog-digital converter means for converting said measuring signal from said receiver (R) and wherein an evaluating device [[(6)]] for [[the]] a subsequent digital evaluation of said converted measuring signal by means of a correction characteristic (KK) is provided for generating a detection signal.

144. (Cancelled).

145. (Currently Amended) Device according to claim [[144]] 136, wherein the measuring signal phase evaluating device has a synchronous rectifier [[(62)]] for determining [[the]] a phase difference between [[the]] a phase of the transmitter (T) signal [[(67)]] and [[the]] a phase of the receiver (R) signal [[(68)]].

146. (Currently Amended) Device according to claim 145, wherein said synchronous rectifier [[(62)]] is equipped with analog signal output.

147. (Currently Amended) Device according to claim 145, wherein said synchronous rectifier [[(62)]] is equipped with digital signal output.

148. (Currently Amended) Device according to claim [[144]] <u>136</u>, wherein there is a device [[(64)]] for [[the]] <u>a</u> logical interconnection of both signals of the evaluating devices [[(61, 62)]].

149. (Currently Amended) Device according to ~~one of the claims~~ <u>claim</u> [[144]] <u>136</u>, wherein a device [[(64)]] is provided for linking the two signals of the evaluating devices [[(61, 62)]] as a weighted comparison.

150. (Previously Presented) Device according to claim 136, wherein said correction characteristic is built up as a zonal combination of several different correction characteristics over the entire weight per unit area range.

151. (Currently Amended) Device according to claim 136, wherein said correction characteristic for first flat objects is provided as almost inverse characteristic to said characteristic of the measuring signal input voltage ~~(UE, UM)~~ <u>(U_E, U_M)</u>.

152. (Currently Amended) Device according to claims 136, wherein said correction characteristic (KK[[, 23]]) is fixed<u>, and wherein said fixed correction characteristic is</u> impressed.

153. (Currently Amended) Device according to claim 136, wherein said correction characteristic (KK[[, 23]]) is given in <u>a</u> material specific manner.

154. (Currently Amended) Device according to claim 136, wherein said correction characteristic (KK[[, 23]]) is regulated dynamically.

155. (Currently Amended) Device according to claim 136, wherein with respect to the single, missing and multiple sheet for the first flat objects, said evaluating device [[(4)]] is provided with at least two thresholds in the form of an upper and lower threshold and when the incoming measuring signal is greater than the upper threshold, this is detected as a "missing sheet", when the incoming measuring signal is between the thresholds this is detected as a "single sheet" and when the incoming measuring signal is smaller than the lower threshold, this is detected as a "multiple sheet".

156. (Currently Amended) Device according to claim 155, wherein the thresholds are ~~designed so as to be~~ dynamically carried along.

157. (Currently Amended) Device according to claim [[150]] 155, wherein the thresholds are ~~designed so as to be~~ set in fixed manner.

158. (Currently Amended) Device according to claims 136, wherein said flat objects are passed between said transmitter (T) and receiver (R) and as a function of the specific object measuring signal received and wherein the object-specific switching threshold can be determined in automatic triggered manner relative to the target characteristic.

159. (Currently Amended) Device according to claim 136, wherein said sensor device [[(10)]] has at least one sensor selected from the group consisting of ~~out of the group of~~ ultrasonic, optical, capacitive and inductive sensors.

160. (Currently Amended) Device according to claim 136, wherein said transmitter (T) and receiver (R) of the sensor device are mutually oriented[[,]] in [[the]] a main beam axis of the radiation used and wherein the main beam axis is oriented substantially perpendicular to [[the]] a plane of the flat objects [[(2)]] arranged between transmitter (T) and receiver (R).

161. (Currently Amended) Device according to claim 136, wherein said transmitter (T) and receiver (R) of the sensor device are mutually oriented in [[the]] a main beam axis

of the radiation used and wherein the main beam axis is oriented under an angle to [[the]] a plane of the flat objects [[(2)]] arranged between transmitter (T) and receiver (R).

162. (Currently Amended) Device according to claim 136, wherein said evaluating device [[(4)]] has several parallel-connected amplifying devices ~~(21, 22)~~, whose output signals are combined for said target characteristic [[(23)]].

163. (Currently Amended) Device according to claim 136, wherein said sensor device [[(10)]] has an operating mode which can be transformed from pulsed operation to continuous operation and vice versa.

164. (Previously Presented) Device according to claim 136, wherein in continuous operation the transmitting signal has phase jumps.

165. (Previously Presented) Device according to claim 136, wherein in continuous operation the transmitting signal has short interruptions.

166. (Previously Presented) Device according to claim 136, wherein said transmitting signal is frequency-modulated.

167. (Currently Amended) Device according to claim 136, wherein a device for setting [[the]] a transmitting frequency with respect to the receiver (R) signal is provided.

168. (Currently Amended) Device according to claim 136, wherein a device for setting [[the]] a transmitting amplitude with respect to the receiver (R) signal is provided.

169. (Previously Presented) Device according to claim 167, wherein auto-balancing means are provided and auto-balancing can be performed in times synchronized with the transmitting frequency or in defined pause periods.

170. (Currently Amended) Device according to claim 136, wherein said transmitter (T) and receiver (R) have sensor heads and [[the]] a spacing between said sensor heads, can be varied as a function of the application.

171. (Currently Amended) Device according to claim 136, wherein there is a feedback device between said evaluating device [[(4)]] and said sensor device [[(10)]].

172. (Currently Amended) Device according to claim 136, wherein said evaluating device [[(4)]] has several specific channels for the detection of said first flat objects and said second flat objects, [[that]] wherein different correction characteristics are impressed on the channels, and [[that]] wherein there are multiplexers ~~(34, 35)~~ for controlling the inputs and outputs of said channels for producing an overall target characteristic.

173. (Currently Amended) Device according to claim 136, wherein said transmitter (T) is provided below the flat objects to be detected and said receiver (R) above the [[same]] flat objects to be detected and [[that]] wherein a head of the transmitter (T) head has a limited spacing from the flat object.

174. (Currently Amended) Device according to claim [[136]] 159, wherein between the transmitter (T) and said flat objects [[(2)]] to be detected there is at least one pinhole diaphragm for improving [[the]] a spatial resolution ~~in the case of sensors out of the group~~ of ultrasonic and optical sensors.

175. (Currently Amended) Device according to claim [[136]] 159, wherein between the transmitter (T) and said flat objects [[(2)]] to be detected there is at least one lens for improving [[the]] a spatial resolution ~~in the case of sensors out of the group~~ of ultrasonic and optical sensors.

176. (Currently Amended) Device according to claim 174, wherein ~~the arrangement of the~~ each diaphragm[[s]] ~~takes place~~ is arranged transversely to [[the]] a movement direction of said flat objects.

177. (Currently Amended) Device according to claim 174, wherein ~~the arrangement of the~~ each diaphragm ~~takes place~~ is arranged longitudinally to [[the]] a movement direction of the second flat objects.

178. (Currently Amended) Device according to claim 174, wherein slit diaphragms are positioned in a thread running direction for detecting elongated second flat objects adhesively applied to the ~~base~~ support material.

179. (Currently Amended) Device according to claim 174, wherein said flat objects [[(2)]] introduced between transmitter (T), receiver (R) and the diaphragm float as close as possible over the diaphragm.